SECTION 07220

ROOF INSULATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work Included: Provide and install all roof insulation as shown on the roof plans and detail drawings and as specified herein.

1.02 RELATED SECTIONS

A. Section 03521 – Lightweight Concrete Insulating Fill Repairs

B. Section 05315 – Steel Deck Repair/Replacement

C. Section 07513 – Modified Bitumen Cap Sheet Asphalt Roofing

D. Section 06100 - Rough Carpentry

1.03 REFERENCES

A. FM - Roof Assembly Classifications.

B. UL - Fire Hazard Classifications.

1.04 SYSTEM DESCRIPTION

A. U.L. Class A System.

B. F.M. Wind Uplift Resistance:

1. FM approved insulation assembly recommendations.

1.05 SUBMITTALS

A. As provided in Section 01330 and 01340 and as required by the consultant.

B. Product data:

1. Insulation.

2. Manufacturer’s installation instructions.

C. Product sample, 12 inches by 12 inches:
   1. Insulation.

1.06 QUALITY ASSURANCE

A. As provided in Section 01450.

B. Standards: Comply with the standards specified in this section and as listed in the General Requirements.

C. Qualifications of Manufacturer: Products used in the work included in this section shall be produced by manufacturers engaged in the manufacturing of similar items and with history of successful production and product installations.

D. Qualifications of Installers: Installers shall be thoroughly trained and experienced in the necessary crafts. Installers shall be made familiar with any unique requirements specified for proper performance of the work in this section.

E. Roofing Inspections: Cooperate and coordinate with inspectors, testing agencies and manufacturers, in order to facilitate inspection of insulation installation.

F. Rejection: In the acceptance or rejection of work under this section, no allowance will be made for lack of skill or specification understanding on the part of the workmen. It shall be incumbent upon the Contractor to use adequate numbers of skilled installers and to instruct them in the requirements of the project specifications as well as maintaining a set of the project specifications and drawings on the roof at all times.

G. Replacement: In the event inadequate or improper installation is determined, the Contractor shall make all repairs and replacements required to render the installation compliant with the project specifications. Replacements, due to improper performance, shall be at the sole cost of the Contractor.

1.07 REGULATORY REQUIREMENTS

A. As provided in the General Conditions.

B. As provided in Article 1.04, this section.

1.08 PRECONSTRUCTION CONFERENCE

A. As provided in Section 01312.

1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

A. As provided in section 01610.

B. Coordinate delivery with City.

C. Prevent wrappers and packaging materials from inclusion in the insulation system.

1.10 ENVIRONMENTAL REQUIREMENTS

A. Insulation installation shall not commence during inclement weather.

B. Insulation installation shall not commence on a day when precipitation is imminent or probable.

C. Insulation installation shall not proceed over damp or inadequate substrates.

D. Work demolition or removal work shall not commence on a day when the chance of precipitation is 30% or higher as forecast by the National Weather Service or local forecasts.

1.11 SEQUENCING AND SCHEDULING

A. Coordinate and schedule all phases of the Work of the Contract Documents with the City, Subcontractors, Material Suppliers and other parties as necessary to ensure the smooth and orderly transition of separate phases, or portions, of the Work, the timely placement of components and materials, including the complete cooperation between parties and proper execution of the Work.

B. Work shall not be performed outside of normal business hours without the prior approval of the City of Houston.

C. Work is to be performed on a daily basis, with each section completed before progressing to the next days work.

D. Completion of work shall be defined as all specified existing roof preparation and the complete installation of all insulation, field membrane, flashings, counterflashings, sheet metal work, sheet metal fasteners and caulking.

E. In no case shall the contractor remove more existing roofing than can be completely installed within one (1) hour of the end of the working day.

F. Contractor shall complete new roof drain, overflow drain, drain line installation and secondary roof system prior to the installation of the tapered insulation system.

G. Proceed with insulation application concurrently with Section 07513 - Mineral Surfaced Cap Sheet Built-Up Roofing.

1.12 GUARANTEE AND WARRANTIES

A. The Contractor shall provide the City with the roof insulations manufacturer' 10 year NDL guarantee in conjunction with Section 07513 – Modified Bitumen Cap Sheet Built-Up Roofing.

B. The Contractor shall warrant the work performed under this Section for a period of 5 years from the date of substantial completion. The Contractor shall accept the responsibility for the correction of defects in materials and workmanship and the repair of same upon notice by the City and at no cost to the City.

PART 2 - PRODUCTS

2.01 INSULATION MATERIALS

A. Insulation to be of the type and minimum thickness as listed here.

B. Gypsum Fiber Insulation Board (Top Layer)

1. SecuRock by USG Corporation, felt facers designed for bonding with hot asphalt. Thickness shall be 1/2”. . Minimum aged "R" value shall be 1.0 per inch.

C. Polyisocyanurate Insulation Board (Flat Stock and Tapered Insulation System and for Crickets and Saddles)

1. Insulation is to be a closed-cell, polyisocyanurate foam core with factory laminated facers. Foam core is to have a rated flame spread of 25 or less. Insulation to conform to federal specification HH-I-1972/2. Flat Stock Insulation is to be supplied in 2.5 in thick 4' x 4' boards. Minimum aged "R" value shall be 6.0 per inch. Tapered insulation boards shall be supplied in boards 1/4″per foot slope on crickets and saddles, and provide positive slope for drainage.

2. Approved Products

a. Flat or Tapered Polyisocyanurate Roof Insulation by Performance Roof Systems, Inc.

b. EnergyGuard Tapered PolyIso Roof Insulation by GAF.

c. As approved by the roof system manufacturer for incorporation into the system warranty.

D. Perlite cant strips shall be a minimum 3.5" X 3.5" with a 45 degree angle and be as supplied by the perlite insulation manufacturer.

E. 24" Tapered polyisocyanurate edge strips shall be 1/2" per foot taper and be as supplied by the polyisocyanurate insulation manufacturer.

2.02 RELATED MATERIALS

A. Heat resistant insulation:

1. Molded hydrous calcium silicate-based or perlite based ridge pipe insulation, pre-manufactured in 2-inch minimum thickness.

2. Acceptable product: “Thermo - 12 Gold” by Johns Manville or “Calsilite” by Calsite Manufacturing Corporation.

B. Compressible fill insulation:

1. Foil faced fiberglass batten roll insulation.

2. Acceptable products: As manufactured by Owens Corning.

C. Asphalt adhesive: Type IV Roofing Asphalt shall conform to ASTM D-312, as approved by the roof system manufacturer.

D. Insulation Fasteners:

1. Steel Deck: CR-10 fluorocarbon coated, self-tapping screws of sufficient length to penetrate the steel deck a minimum of 1-inch (25mm), minimum 3-inch (75mm) diameter steel plates with recessed screw head for use with insulation, such as #15 Extra Heavy Duty Roofing Fastener" as manufactured by OMG Roofing Products. Other fasteners may be approved providing contractor arranges and pays for testing of the fastener to provide evidence it will meet wind uplift requirements. No change orders for an increase in contract will be provided for additional fasteners as a result of testing and approval of other fasteners.

2.03 ROOF MEMBRANE MANUFACTURER'S APPROVAL

A. All insulation shall be approved in writing by the roof membrane manufacture as an acceptable substrate to receive their roof system in order to meet specified code

requirements and obtain warranties as specified.

PART 3 - EXECUTION

3.01 MECHANICAL ATTACHMENT OF BASE LAYER INSULATION

A. Over completed venting base sheet installation, install base layer of insulation in line of longitudinal joints perpendicular to deck material longitudinal joints and/or slope.

B. Layout with lateral joints staggered.

C. Mechanically attach to metal deck:

1. Fastener installation:

a. Fasteners shall be driven perpendicular to deck.
b. Fasteners shall engage top flanges of metal deck only.
c. Fasteners shall penetrate deck a minimum of 1 inch.
d. Installation shall be accomplished utilizing tools designed or approved by the fastener manufacturer.

2. Fastener pattern on each board:

a. See FM Loss Prevention Data Sheet 1-29 or as indicated on the drawings, whichever is greater.

3. Partial boards shall be fastened at a rate commensurate with full boards, but in no case shall have less than 2 fasteners per piece.

3.02 BITUMEN ATTACHMENT OF SUCCESSIVE LAYERS OF INSULATION

A. See Section 07513, paragraph 3.05 for heating and handling requirements for asphalt and installation of venting base sheet. Install venting base sheet prior to installation of insulation.

B. Successive layers of insulation, crickets and tapered edge strips are to be installed over approved base layer of mechanically attached in a solid mopping of hot asphalt. Bitumen is to be applied at a rate of 30 to 35 Lbs/100 sq. ft., minimum. See Section 07513, paragraph 3.05 for heating and handling requirements for asphalt and installation of venting base sheet.

C. The application or embedment temperature of the asphalt used to adhere roof insulation shall be at the minimum range of the EVT of the asphalt used to ensure complete adhesion of the insulation boards.

D. Insulation boards are to be "stepped in" continuously to assure 100% adhesion. Un-adhered insulation shall be removed and replaced at no cost to the City of Houston.

E. Insulation is to be installed with all joints staggered and tightly butted. Gaps between insulation boards shall not exceed 1/8". Insulation is to fit tightly around projections. Gaps or joints greater than 1/8" are not acceptable and shall be filled with insulation materials trimmed to fit tightly in the gap.

F. Joints in top layer(s) of insulation are to be offset from the bottom layer(s) of insulation a minimum of 12".

G. Insulation is to be installed with full bearing (all four edges) on the underlying substrate.

H. Install insulation with no cantilevered joints.

I. Install insulation crickets, saddles, cants and tapered strips over the completed base layers of insulation per items A through G, above.

3.03 CRICKETS AND SADDLES

A. Install crickets and saddles on the up-slope sides of all rooftop projections whose widths are in excess of 3 linear feet, and in between roof drains prior to the installation of the gypsum fiber board or top layer.

B. Install crickets and saddles in additional areas that display evidence of ponding water. Contractor shall be responsible for eliminating ponding water on this project. Perform this work as portion of the base bid.

C. Install crickets and saddles fully adhered in hot asphalt over the underlying substrate:

1. Install boards to each other and adjacent materials::

    a. Gaps in excess of 1/8 inch not acceptable.
    b. Fill voids and gaps with insulation trimmed to fit.
    c. Fully walk-in to ensure full adhesion.

2. Adhere in solid moppings of Type IV asphalt at an application rate of 30 pounds per 100 square feet.
3. Install one additional membrane ply in hot asphalt along the drainage valley or apex of the cricket prior to membrane roofing application.

3.04 HEAT RESISTANT INSULATION

A. Install heat resistant insulation around heat emitting vent pipes, and where indicated on the detail drawings.

3.05 FILLER INSULATION

A. Install fiberglass compressible insulation at deck opening, projections, penetrations, and curbs as indicated on the detail drawings.

3.06 VERIFICATION

A. Upon completion of the installation in each area, visually inspect and verify that all components are complete and properly installed.

END OF SECTION